

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on October 7, 2002, and the references cited therewith.

Claims 59, 73, 74 and 84 are amended; as a result, claims 59-84 are now pending in this application. Claims 59 and 84 are amended to correct a typographical error. The colon following "a frequency divider circuit comprising" has been changed to a comma.

§112 Rejection of the Claims

Claims 73-74 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

In reference to claim 73, the Office Action indicated that it was unclear as to which figure the language of claim 73 reads on. The Office Action has not cited a rule (e.g., from the CFR, MPEP, or governing case law), and Applicant knows of no such rule, requiring claim language to be tied with a specific figure. However, the language of claim 73 has abundant support in the specification. In particular, this claim is directed to the circuit arrangement shown in Figure 1 where the inverters are identified by dashed boxes 1 and 3 (which each include a p-channel transistor and an n-channel transistor). The two pairs of n-channel transistors are shown in the dashed boxes 5 and 7, which received the clock input signal.

Applicant has amended claim 73 to more clearly point out the subject matter regarded as the invention. Therefore, Applicant submits that claim 73 is condition for allowance.

In reference to claim 74, the Office Action indicated that claim 74 was indefinite because of the technical deficiencies of claim 73. Because claim 73 has been amended to overcome the rejection under 35 USC § 112, Applicant respectfully submits that claim 74 is in condition for allowance.

§103 Rejection of the Claims

Claims 59-70, 72-82 and 84 were rejected under 35 USC § 103(a) as being unpatentable over Suzuki et al. (U.S. Patent No. 4,356,411) (Suzuki et al. will hereinafter be referred to as Suzuki).

The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)).

The Office Action cited two differences between Suzuki and the invention as claimed in independent claims 59, 75, and 84. In citing the first difference, the Office Action admitted that Suzuki uses a single periodic signal for both even and odd amplifiers instead of a periodic signal and its complement for even and odd amplifier stages. As for the second difference, the Office Action admitted that in Suzuki, the periodic signal generated a square wave instead of an analogue periodic signal, as called for in claims 59, 75, and 84¹. These admitted differences mean that Suzuki has only one generating means, which is also structurally different from the claimed generating means because it generates different signals.

In reference to the first difference (cited above), the Office Action asserts that one skilled in the art would have recognized that the p-channel transistors receiving the clock signal is functionally equivalent to n-channel transistors receiving the opposite phase of the clock. The Office Action further asserts that it would have been obvious to a person skilled in the art, at the time of the invention, to replace the p-channel transistors in Suzuki with n-channel transistors

¹ According to language of claims 59, 75, and 84, the analogue periodic signal has an amplitude that causes the transistors (to which the periodic signals are applied) to be not fully opened or fully closed, but to act as variable resistances.

coupled to an inverter for receiving a complimentary version of the clock signal because the substitution is equivalent and would not alter the operation of the frequency divider.

The Applicant respectfully disagrees with these assertions because they mischaracterize the teachings of the prior art. In particular, the two circuits are not equivalent because the switching threshold for the p-channel transistor is different from the switching threshold for the n-channel transistor. The difference in the switching thresholds of p-channel and n-channel transistors is not significant when operating at relatively low frequencies and with square wave clock signals, which swing from rail to rail. However, the difference in p-channel and n-channel operating thresholds is significant and will alter the way the circuit operates when the circuit is driven with analog signals having amplitudes that cause the transistors to be not fully opened or fully closed and to act as variable resistances, as set out by claims 59, 75, and 84.

Additionally, it is unlikely that the device described in Suzuki would operate as claimed in independent claims 59, 75, and 84 because the switching thresholds of the complimentary p and n channel transistors will not vary in the same way with variations in supply voltage, temperature, etc. In contrast, when complimentary driving signals are used and applied to transistors of the same type, it is possible to arrange the transistors to have near identical switching threshold points, which will also track with each other with variations in supply voltage, temperature, etc. Therefore, the Applicant respectfully submits that these two types of circuits are not equivalent and that it would not be obvious to modify Suzuki in the manner suggested in the Office Action.

Regarding the second difference between Suzuki and the invention as claimed in independent claims 59, 75, and 84, the Office Action asserts that it would have been obvious to recognize that Suzuki would perform substantially the same frequency dividing function for both square waves and analog signals. Effectively, the Office Action is asserting that it would have been obvious to modify the signal generating means of Suzuki to generate an analogue periodic signal having amplitudes causing the transistors to be not fully opened or fully closed and to act as variable resistances. However, the Office Action has failed to show any teaching or motivation that would suggest making this modification to Suzuki. Instead, the Office Action refers to Schilling, which describes the way a transistor works, but does not disclose or suggest any of the concepts cited above. Therefore, because the Office Action has not cited a proper

motivation to modify Suzuki, the Office Action has relied on the Applicant's specification or impermissible hindsight.

Based on the foregoing, Applicant respectfully requests that the examiner withdraw the rejection under 35 USC §103(a) of independent claims 59, 75, and 84 over the cited references. Furthermore, Applicant respectfully submits that these claims are in condition for allowance. Additionally, Applicant respectfully submits that the rejected dependent claims depending from independent claims 59, 75, and 81 are allowable for the same reasons as cited above.

Claims 71 and 83 were rejected under 35 USC § 103(a) as being unpatentable over Suzuki et al. (U.S. Patent No. 4,356,411) in view of Maemura (U.S. Patent No. 5,172,400). In this rejection, the Office Action asserts that Suzuki's Figure 5 teaches and suggests all the limitations recited in claims 59 and 75. Dependent claim 71 includes all the limitations of independent claim 59, while dependent claim 83 includes all the limitations of independent claim 75. As explained above, Suzuki does not disclose or suggest the invention as claimed in independent claims 59 and 75. Therefore, the only way the combination of Suzuki and Maemura can render the claimed invention obvious is for Maemura to provide what Suzuki is lacking. Regarding claims 59 and 75, as explained above, Suzuki is at least lacking a motivation to modify its signal generating means to generate an analogue periodic signal having amplitudes causing the transistors to be not fully opened or fully closed and to act as variable resistances. The Office Action indicates that Maemura teaches the use of logical circuitry implemented between two amplifier stages to obtain a division ratio other than a power of two. Because Maemura does not provide what Suzuki is lacking, the combination cannot render the rejected claims obvious, as it does not teach or suggest all the limitations of dependent claims 71 and 83. Therefore, Applicant requests that this rejection be withdrawn.

Claims 59-73 and 75-84 were rejected under 35 USC § 103(a) as being unpatentable over Rollins et al. (U.S. Patent 5,036,217). In this rejection, the Office Action identified the same two differences between Rollins and the claimed invention (as set out in independent claims 59, 75, and 84) as were cited above (see discussion of Suzuki above). For the same reasons described above in the discussion of Suzuki, the Office Action failed to point to a passage in the cited

references that teaches or provides motivation to modify the circuit described in Rollins to arrive at the claimed invention.

Additionally, Applicant respectfully submits that the rejected dependent claims depending from independent claims 59, 75, and 81 are allowable for the same reasons. Therefore, Applicant requests that this rejection be withdrawn.

Examiner Interview Summary

Applicant thanks the Examiner for the telephone interview held on March 12, 2003, between the Examiner and the Applicant's attorneys during which claim 59 and the cited references were discussed.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612-349-9592) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 7th day of April, 2003.

PATRICIA A. HULTMAN

Name

Signature